

## Functions as Relations

A function (or mapping) from  $A$  to  $B$  is a relation  $f$  from  $A$  to  $B$  such that

- (i) the domain of  $f$  is  $A$ , and
- (ii) if  $(x, y) \in f$  and  $(x, z) \in f$ , then  $y = z$ .

We write  $f : A \rightarrow B$  and this is read “ $f$  is a function from  $A$  to  $B$ ,” or “ $f$  maps  $A$  to  $B$ .” The set  $B$  is called the codomain of  $f$ . In the case where  $B = A$ , we say  $f$  is a function on  $A$ .

Let  $f : A \rightarrow B$ . We write  $y = f(x)$  when  $(x, y) \in f$ . We say that  $y$  is the value of  $f$  at  $x$  (or the image of  $f$  at  $x$ ) and that  $x$  is a pre-image of  $y$  under  $f$ .